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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/396,055	09/15/1999	MOHSEN SARRAF	20-12	6915

7590 07/14/2004

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EXAMINER	
CHOW, CHARLES CHIANG	
ART UNIT	**PAPER NUMBER**
2685	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/396,055	SARRAF ET AL.	
	Examiner	Art Unit	
	Charles Chow	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1,12, 22, 29-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Kleider et al. (US 6,487,252 B1).

Regarding **claim 1**, Kleider et al. (Kleider) teaches the estimating frequency offset (col. 12, lines 25-32) in OFDM system (frequency offset inducer 34, Fig. 3, abstract, Fig. 2) by allocating pilot signature sequence with constellation data (abstract, Fig. 5, col. 5, lines 31-40, col. 12, lines 15-24) and transmitting pilot signature sequence with data to receiver (receiving pilot sequence with data in abstract, col. 4, lines 8-11, col. 11, lines 56-67, Fig. 5).

Kleider teaches the differential encoding in frequency 24 (Fig. 1, col. 4, lines 11-33), the differential decoder 32, the correlator 35, the frequency offset inducer 34 in receiver for estimating, correcting, frequency offset for correct frequency offset (col. 5, line 59 to col. 6, line 49). Kleider teaches the estimating frequency offset by determining the pilot sequence peak autocorrelation (col. 6, lines 2-7).

Regarding **claim 12**, Kleider teaches a method of estimating frequency error in an OFDM system (col. 12, lines 25-32) in OFDM system (frequency offset inducer 34, Fig. 3, abstract, Fig. 2) by allocating pilot signature sequence with constellation data

(abstract, Fig. 5, col. 5, lines 31-40, col. 12, lines 15-24) and receiving pilot signature sequence with data to receiver (receiving pilot sequence with data in abstract, col. 4, lines 8-11, col. 11, lines 56-67, Fig. 5).

Kleider teaches the differential encoding in frequency 24 (Fig. 1, col. 4, lines 11-33).

Kleider teaches the differential decoder 32, the reverse poly-phase matched filter 38 (Fig. 3, col. 4, lines 37-42), the correlating received digital signal using correlator 35 (Fig. 3), the frequency offset inducer 34 in receiver (Fig. 3) for estimating, correcting, frequency offset for correct frequency offset (col. 5, line 59 to col. 6, line 49).

Kleider teaches the identifying based on the pilot sequence peak autocorrelation (col. 6, lines 2-7).

Regarding **claim 22**, Kleider teaches the a method for synchronizing interleavers in OFDM system (synchronization in title, the time tracking 64 in Fig. 6, col. 6, lines 60 to col. 7, line 32).

Kleider teaches allocating pilot signature sequence with constellation data (abstract, Fig. 5, col. 5, lines 31-40, col. 12, lines 15-24) and receiving pilot signature sequence with data to receiver (receiving pilot sequence with data in abstract, col. 4, lines 8-11, col. 11, lines 56-67, Fig. 5).

Kleider teaches the differential encoding in frequency 24 (Fig. 1, col. 4, lines 11-33).

Kleider teaches the differential decoder 32, the reverse poly-phase matched filter 38 (Fig. 3, col. 4, lines 37-42), the correlating received digital signal using correlator 35 (Fig. 3), the frequency offset inducer 34 in receiver (Fig. 3) for estimating, correcting, frequency offset for correct frequency offset (col. 5, line 59 to col. 6, line 49).

Kleider teaches the identifying based on the pilot sequence peak autocorrelation (col. 6, lines 2-7).

Regarding **claim 29**, Kleider teaches a receiver in OFDM system (Fig. 3) having matched poly filter for pilot sequence correlation (the reverse poly-phase matched filter 38 in Fig. 3, col. 4, lines 37-42).

Kleider teaches the differential encoding in frequency 24 (Fig. 1, col. 4, lines 11-33).

Kleider teaches the differential decoder 32, the reverse poly-phase matched filter 38 (Fig. 3, col. 4, lines 37-42), the correlating received digital signal using correlator 35 (Fig. 3), the frequency offset inducer 34 in receiver (Fig. 3) for estimating, correcting, frequency offset for correct frequency offset (col. 5, line 59 to col. 6, line 49).

Kleider teaches the identifying based on the pilot sequence peak autocorrelation (col. 6, lines 2-7).

Regarding **claim 30**, Kleider teaches a receiver in OFDM system (Fig. 3), the means for receiving inserted pilot signature in data (col. 12, lines 25-32, Fig. 3, abstract, Fig. 5, col. 5, lines 31-40, col. 12, lines 15-24, the transmitting pilot signature sequence with data to receiver, col. 4, lines 8-11, col. 11, lines 56-67, Fig. 5), having matched poly filter for pilot sequence correlation (the reverse poly-phase matched filter 38 in Fig. 3, col. 4, lines 37-42).

Kleider teaches the differential encoding in frequency 24 (Fig. 1, col. 4, lines 11-33).

Kleider teaches the differential decoder 32, the reverse poly-phase matched filter 38 (Fig. 3, col. 4, lines 37-42), the correlating received digital signal using correlator 35 (Fig. 3), the frequency offset inducer 34 in receiver (Fig. 3) for estimating, correcting, frequency offset for correct frequency offset (col. 5, line 59 to col. 6, line 49).

Kleider teaches the a method for synchronizing interleavers in OFDM system (synchronization in title, the time tracking 64 in Fig. 6, col. 6, lines 60 to col. 7, line 32), based on the pilot sequence peak autocorrelation (col. 6, lines 2-7).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth insection 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 2-10, 13-20, 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Kleider, in view of Rakib et al. (US 6,307,868 B1),

Regarding **claim 2**, Rakib teaches the block interleaver in Fig. 14, 16 for a system for transmitting encoded master carrier and encoded master clock for headend modem transceiver, using orthogonal codes, for periodically adjusting the phase of the master carrier and master clock at central unit, title, abstract, Fig. 1, Fig. 9, Fig. 37). Besides, Rakib teaches the transmitting Barker code encoded carrier/clock signature sequence in between central unit and remote unit (col. 14, lines 27-20; col. 17, lines 14-20); the centering/fine tuning the window for Barker code (Fig. 36, 137); and the guard gap is reserved for the Barker code (col. 18, lines 57-67, col. 42, lines 22-23; and in Fig. 9, Fig. 13, Fig. 14, Fig. 16; col. 10, lines 5-15; col. 40, lines 57-67). Rakib teaches the interleaver for adding the referencing Barker code in the last column, guard gap, such that the referencing signal for frequency offset to be transmitted the receiver.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Kleider, and to include Rakib's interleaver for allocating Barker code to guard gap, such that the referencing signal for correcting frequency offset could be transmitted to the receiver for frequency offset correction. Rakib also teaches the dedicated time slot is allocated to the Barker code sequence (col. 17, lines 19-20), and guard gap is assigned for Barker code stored in the last column.

Regarding **claim 3**, Kleider has taught above the pilot signature sequence is transmitted over a number of bins in upper and lower side bands of digital signal (Fig. 5, across frequency bins, col. 2,l ines 60-64, the D4psk 16 QAM double sided modulation, col. 2,l ines 41-46).

Regarding **claim 4**, it is well-known in the technology for the feedback technique to correct the frequency, phase error.

Regarding **claim 5**, it is well-known in the technology for the feed forward technique to correct frequency, phase, error

Regarding **claims 6, 7,** Rakib has shown above, in Fig. 9, 13, 14, 16, col. 10, lines 5-15; col. 40, lines 57-67; col. 42, lines 22-32; ranging window Fig. 70; it shows after the data interleaver memory is full with blocks (334, 336, 338), then, the insertion of the Barker code information is delayed for delays t_d by the interleaver after the memory is completely filled with blocks of data , in order to insert the Barker code information in the guard gap. Thus, for L number of blocks and at the end of the memory full, delay for t_d times, then the Barker code signature sequence is transmitted every time the memory is full, in the guard gap position, allocated for the Barker code information.

Regarding **claim 8,** Rakib has taught above the delay time t_d for transmitting the Barker code in the guard gap (col. 10, lines 5-15; col. 40, lines 57-67; col. 42, lines 22-32). The delay time t_d would cause the effect of delay from one side band to the other side band because of the SDMA differential phase shift key DPSK modulation (col. 2, line 12, Fig. 44), the delay of the Barker code in time would cause the frequency shift in the side band.

Regarding **claims 9, 10,** Rakib has taught above, the delay time for centering the Barker code in the guard gap, and in col. 27, line 44; col. 28, lines 3-13, Rakib considers the fine tuning of positioning the Barker code in the guard gap window.

Regarding **claim 13**, Rakib has taught in claim 2 above, for the signature Barker code encoded sequence, which is stored in the memory last column (guard gap) of the block (frame) interleaver. (Beside, Rakib's frame contains plurality of blocks, as shown above.)

Regarding **claims 14, 24**, Kleider has taught above in claim 3 above, for the over upper and lower side bands of the phase shifted keying side bands.

Regarding **claim 15**, it is well-known in the technology for the feed back technique to correct frequency, phase, error.

Regarding **claim 16**, it is well-known in the technology for the feed forward technique to correct frequency, phase, error.

Regarding **claims 17, 25**, Rakib has taught above in claims 6, 7, for the receiver and the signature sequence is received every L data frames that can fill the interleaver memory. Rakib has shown above, in Fig. 9, 13, 14, 16, col. 10, lines 5-15; col. 40,

lines 57-67; col. 42, lines 22-32; ranging window Fig. 70; it shows after the data 'interleaver memory is full with blocks (334, 336, 338), then, the insertion of the Barker code information is delayed for delays t_d by the interleaver after the memory is completely filled with blocks of data , in order to insert the Barker code information in the guard gap. Thus, for L number of blocks and at the end of the memory full, delay for t_d times, then the Barker code signature sequence is transmitted every time the memory is full, in the guard gap position, allocated for the Barker code information.

Regarding **claims 18, 26**, Rakib has taught above in claim 1 above, the interleaver memory is full.

Regarding **claim 19**, Rakib has taught above in claim 8 above, for the delayed from the other side band.

Regarding **claim 20**, Rakib has taught above in claim 9 above, for the maintaining the signature sequence in the center of the search window.

Regarding **claim 22**, Rakib has taught above in claim 8 above, for the delayed from the other side band. Rasky has taught above the differential encoding signature sequence. Rakib has taught above the transmitting Barker code encoded carrier/clock signature sequence in between central unit and remote unit (col. 14, lines 27-20; col. 17, lines 14-20).

Regarding **claim 23**, Rakib has taught in claim 2 above, the Barker code signature sequence is stored in last column of block interleaver.

Regarding **claim 27**, referring to examiner's comment in claim 8 above, for the delayed from the other side band.

3. Claims 11, 21, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleider in view of Van Nee (US 6, 404,732).

In the above, it does not clearly teach the very low side-lobe.

Regarding **claim 11**, Van Nee teaches the digital modulation system which provides the enhanced multipath performance by using the modified orthogonal codes such that the autocorrelation side lobes would be reduced to the possible level during the correlation. The M codes for autocorrelation is the complementary Barker code received in the orthogonal codes autocorrelation (as shown in abstract, col. 1, lines 62-67; col. 3, lines 40-53; col. 6, lines 16; col. 4, lines 60-66; the complementary Barker code has low sidelobes). Van Nee teaches the complementary Barker code, such that the system could efficient of having the high level of autocorrelation because of the low autocorrelation side lobes (col. 1, lines 62-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Kleider above, and to include Van Nee's reduced low autocorrelation side lobes using modified complementary Barker code, such that the system could be efficient of having high on the autocorrelation by reducing the autocorrelation side lobes, using the modified complementary Barker code.

Regarding **claims 21, 28**, Van Nee has taught above in claim 11 the very low side-lobe.

Response to Arguments

4. Applicant's arguments filed 5/5/2004 have been fully considered but they are not persuasive

Regarding applicant's argument for the no teachings from Kleider-'252 B1, for the differential encoder performed in frequency, due to inverse FFT performed by polyphase filter is back into time domain, and signature sequence is contained in an expected location (applicant's remark in page 3, line 2-7), Kleider does teach the differential encoder 24 (Fig. 1) performs differential encoding in frequency, for providing encoded signal for the orthogonal frequency division multiplexed OFDM signals transmitted from transmitter 26. The differential encoder 24 is to differentially encode the difference of the received data information onto the frequency, carrier, of the orthogonal frequency signal in the OFDM signals, and the differential encoder needs to operate onto frequency information in order to encode the received data onto the carrier frequency, for the differential encoding performed in frequency. The polyphase filter 16 does perform filtering operation in frequency domain utilizing inverse FFT for corresponding frequency bin (the pilot tones are assigned across the frequency bin which is operated by polyphase filter 16, for the polyphase filter 16 is operated in frequency domain, col. 2, lines 60-64; col. 2, lines 60-64; the transmitter 10 does perform modulation in frequency for the OFDM signal (steps 108, 110, 112, Fig. 2), the differential encoder 24 performs the differential encoding according to the incoming frequency data information.

Regarding the signature sequence is contained in an expected location, Kleider teaches the digital signal processing for inserting pilot sequence into frequency bins according to the frequency bin assignment table 110 (Fig. 2, Fig. 5; col. 3, lines 54-67; col. 12, lines 15-24), for the signature sequence is contained in an expected location.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (703)-306-5615. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban, can be reached at (703)-305-4385.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9306 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Charles Chow C.C.

June 24, 2004.

7/12/04

QUOCHIEN B. VUONG
PRIMARY EXAMINER